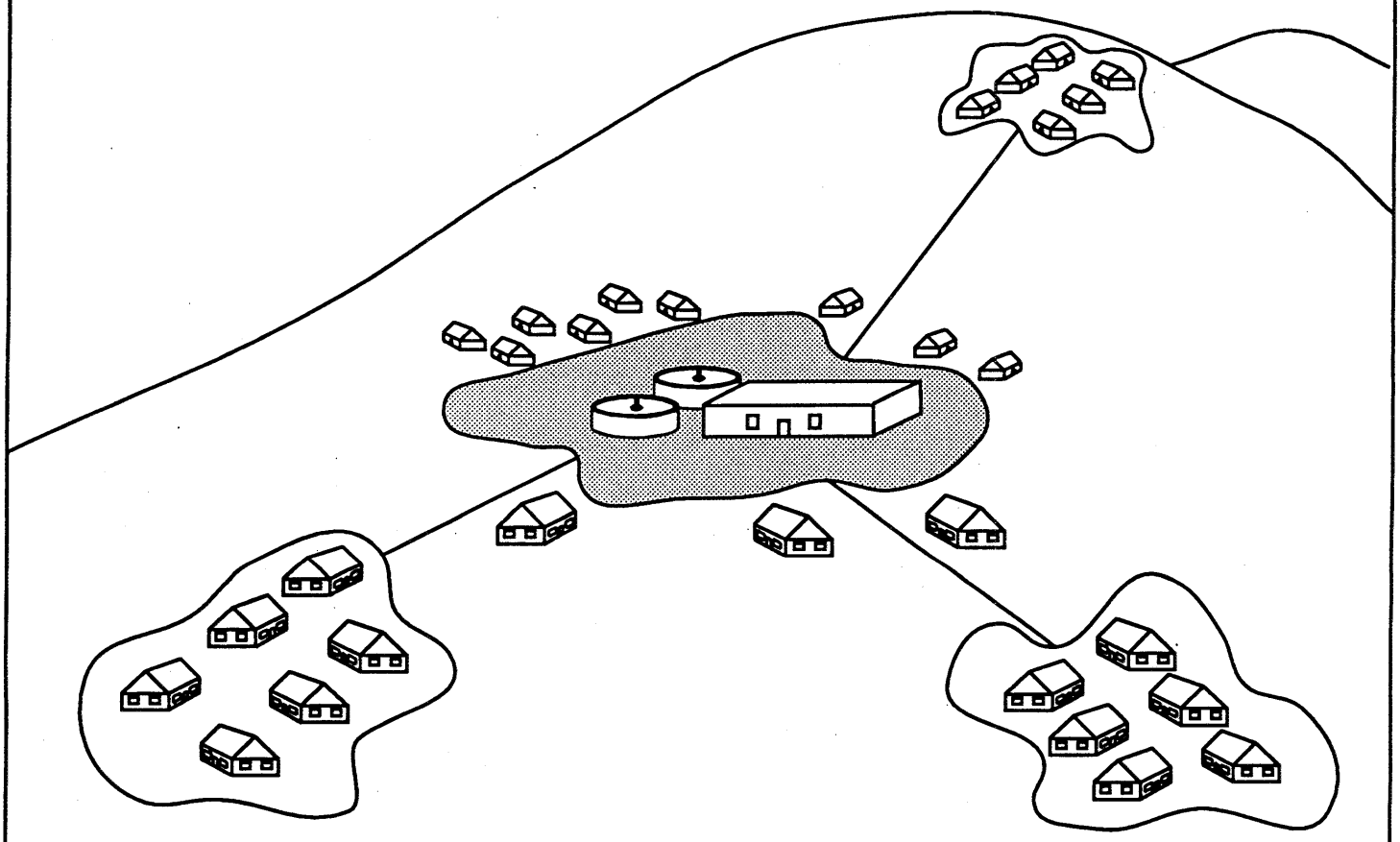
# Regionalization of Wastewater Treatment Facilities in Kentucky:

*Progress, Problems, & Recommendations*

## Executive Summary



Natural Resources and Environmental Protection Cabinet
Kentucky Division of Water

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# REGIONALIZATION OF WASTEWATER TREATMENT FACILITIES IN KENTUCKY:
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## EXECUTIVE SUMMARY

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### Introduction

The purpose of this report is to demonstrate the problems associated with package plants; to describe ongoing efforts to reduce the number of package plants through Kentucky's wastewater regionalization efforts; and to recommend several measures, including legislation and regulations, to facilitate regionalization as a means to improve water quality throughout the Commonwealth.

### Analysis of Wastewater Problems in Kentucky

The human health and environmental implications of poor wastewater treatment can be severe. Domestic wastewater effluent pollutes its receiving water, particularly small streams, with bacteria and nutrients. Disease-causing bacteria including dysentery, hepatitis, meningitis, and diarrhea can infect people who come in contact with contaminated surface water or groundwater. Excess nutrients from sewage stimulate algae growth, and as the algae die the decay process removes dissolved oxygen from the water, depriving resident organisms of the oxygen they need.

**Package plants** are wastewater treatment facilities that are typically purchased and installed as a complete prefabricated unit. These facilities are usually small in size and capacity. They are particularly popular in remote and/or unincorporated areas, where they may serve schools, subdivisions, mobile home parks, commercial establishments, facilities at highway interchanges, recreational facilities, etc. A few small-scale municipal wastewater facilities could also be classified as "package plants" in the strictest sense.

The experience of water pollution control administrators nationwide has indicated a relationship between the size and ownership of facilities and their effectiveness in treating wastewater. The experience of the Kentucky Division of Water (DOW) has been consistent with that on the national level. Data compiled from the self-monitoring reports required of all point-source dischargers, as well as field inspections of permitted facilities, support anecdotal evidence that private package plants on the whole do not perform as well as their municipally owned counterparts.

It is also widely acknowledged that in many cases small wastewater plants randomly sited tend to operate less efficiently than bigger facilities that serve a larger customer base. A report presented to the U.S. Senate Subcommittee on Air and Water Pollution of the Committee on Public Works noted the positive correlation between wastewater plant size and operational reliability:

"Small randomly placed wastewater treatment plants can be inefficient in terms of reliability. Studies...indicate that there is a high correlation between the size of a treatment plant and the percentage of time during which the plant fails to perform according to design standards. In short, the larger the treatment plant, the more reliable is its performance." *(Water Pollution Control Legislation: Hearings Before the Subcommittee on Air and Water Pollution of the Committee on Public Works*, United States Senate 92d. Congress, Washington, D.C.: United States Government Printing Office, May 1971, p. 923)

Given the large number of package plants in comparison to municipal facilities in Kentucky, the generally poor reputation of package plants merits a great deal of concern for present and future water quality in the Commonwealth. Data indicate that the DOW has recently made some progress in reducing the number of package plants permitted in Kentucky. Inactivations of such plants began to outnumber new permit issuances in 1990, 1991 and 1992. However, the DOW seeks to reduce the number still further by continuing and expanding its efforts at wastewater regionalization.

## What Is Regionalization?

In the context of this report, the term **regionalization** is defined as:

1. the elimination of a treatment facility and diversion of its wastewater flow to a Publicly Owned Treatment Works (POTW);

2. the connection of one or more existing facilities into a new or existing regional facility;

3. the prevention of new discharges by requiring connection to an existing facility; or

4. the creation of sanitation districts, regional wastewater authorities, or other cooperative ownership arrangements.

Regionalization may involve various arrangements for facility construction and operation. For example, several jurisdictions might form a regional authority to construct and operate a centralized treatment facility and collection system. Alternatively, one community might act as the lead agency in constructing and operating a centralized treatment facility and the interceptors serving several jurisdictions, while each jurisdiction maintains responsibility for its own collection system.

Regionalization need not, however, involve construction of physically interconnected facilities. For example, individual jurisdictions might be responsible for construction of local facilities, including any onsite systems, while a regional authority would construct and operate other service facilities, such as sludge treatment and disposal facilities. The regional facility may even assume responsibility for operating and/or maintaining the local treatment facilities, including on-site (e.g., septic) systems.

The regionalization initiative should not be seen as a wholesale indictment of package plants and onsite systems. In some situations, such facilities offer the most reasonable choice for wastewater treatment. And in other places they simply cannot feasibly be eliminated given economic, geographic, and technical constraints. However, in too many cases they also constitute a wastewater control method whose proper and continuing operation and maintenance are beyond the interest and capability of the permittee. In general, regionalization promises improved water quality throughout Kentucky.

## Mechanisms for Achieving Regionalization

Kentucky statutes and regulations have given several mechanisms to state and local authorities that can be employed in the effort to achieve regionalization in the physical or organizational sense.

Under state statute, wastewater service can be provided through municipal utilities, sanitation districts, metropolitan sewer districts, interlocal agreements, joint sewer agencies, water districts, for-profit sewer companies, and homeowners associations. These mechanisms can be used where they exist, or created where feasible, to promote and implement regionalization projects.

The DOW regulates the siting, construction, operation and maintenance of both large and small, public and private wastewater systems through its construction permit process, the Kentucky Pollutant Discharge Elimination System (KPDES) permit program, approval of sewer line extensions, and issuance of floodplain construction permits. The Public Service Commission (PSC) regulates the financial operation of those wastewater facilities that are classified as public utilities, including their accounting procedures, rate structures, and bond issues. Through the authority of both of these agencies, regionalization can be encouraged where feasible.

In addition, several state and federal entities offer funding directly for wastewater projects or for infrastructure projects such as wastewater systems that promise to encourage economic development. These funding programs include the State Revolving Fund (SRF), Kentucky Infrastructure Authority (KIA) Fund B, Governmental Agencies Program (KIA Fund C), Farmers Home Administration (FmHA) program, Community Development Block Grant (CDBG) program, Appalachian Regional Commission (ARC) funding, Economic Development Association (EDA) program, Kentucky Association of Counties (KACo) Leasing Trust, and Kentucky League of Cities (KLC) bond pool. The DOW can prioritize regionalization projects in those programs where it has direct input and can promote regionalization as a part of its routine review of federally funded wastewater projects through the State Clearinghouse.

Other entities offer technical assistance to small wastewater system operators and can provide information and advice to communities dealing with wastewater-related problems and potential regionalization projects. Programs offered from within the DOW itself include the Cooperative Operation and Maintenance Training Program (COMPTrain) and the Kentucky Small Community Outreach Program (KY-SCOP). Other valuable resources for assistance include the Kentucky Rural Water Association (KRWA), Kentucky's 15 Area Development Districts (ADDs), and the National Small Flows Clearinghouse in Morgantown, W.Va.

## The Division of Water's In-House Regionalization Efforts

Regionalization concerns have been well-received in the numerous branches of the DOW. Through in-house meetings and pre-existing communication channels, staff in the KPDES, Facilities Construction, Enforcement, and Program Planning & Administration branches have pooled important information and made use of their various authorities to identify and pursue regionalization opportunities.

The **KPDES Branch** has used its permit process to require connection of a package plant to a regional facility when one becomes available and to see that plants are officially inactivated where possible. Staff have actively promoted regionalization to local governments and the public around the state with

numerous presentations and have developed a regionalization strategy for the entire DOW (a copy of this strategy is incorporated into this report as Appendix B).

Since receiving the federal State Revolving Fund (SRF) grant program in 1980, staff in the DOW's **Facilities Construction Branch** responsible for the SRF program have routinely incorporated regionalization considerations in their review of wastewater facility plans and facilities construction permit application reviews. The Facilities Construction Branch also administers a second "tier" of review for non-SRF projects, which are subject to somewhat less detailed review process than SRF-funded projects. The branch routes its written assessments of non-SRF projects to the State Clearinghouse, just as it does for SRF projects, for coordinated review by all state agencies. This procedure ensures that non-SRF projects undergo as comprehensive a review as SRF projects. The Facilities Construction Branch also administers the Kentucky Small Communities Outreach Program (KY-SCOP) to provide information and assistance to small communities with wastewater problems. Through this program, staff can encourage local officials to consider some means of regionalization to meet their wastewater treatment needs.

The **Enforcement Branch** has used its authority in some enforcement cases to compel a regionalization solution where a package plant owner has demonstrated an inability or unwillingness to comply with KPDES permit conditions. Geographically targeted enforcement initiatives have been and will continue to be used to aid regionalization efforts in selected areas of the state, particularly in those areas where package plant proliferation is severely degrading water quality.

The **Field Operations Branch**, with staff in ten field offices, is best situated to assess at ground level the physical and political feasibility of regionalization in a given circumstance. Field staff work closely with the central office to promote regionalization efforts in their regions by assisting enforcement actions against facilities, providing technical assistance to operators, assisting in project assessments, and generally representing the DOW in wastewater-related activities in their regions.

Information exchange has also sensitized the **Program Planning and Administration Branch** staff responsible for reviewing applications for projects requesting federal assistance. The wastewater regionalization concept now receives routine consideration in reviews of all proposed wastewater facility projects requesting federal aid. The Program Planning and Administration Branch has also used monies earmarked for pass-through to regional planning organizations under the Clean Water Act Section 205(j)/604(b) since FFY 1988 to fund wastewater regionalization activities (see below).

## The Section 205(j)/604(b) Program

The federal Clean Water Act provides that 1 percent of a state's allotment of State Revolving Fund (SRF) money be dedicated to water quality management planning activities. Of that amount, the DOW must pass 40 percent through to regional public comprehensive planning organizations and interstate organizations for eligible activities. The DOW has distributed its 40 percent pass-through money to further the regionalization concept by contracting with several organizations to implement strategies for reducing the number of package plants in the state and to assist in improving the performance of those package plants for which connection to larger systems is not feasible. In the course of the Section 205(j)/604(b) program, the DOW has worked with the Bluegrass Area Development District, Gateway District Health Department, Council of State Governments, Lake Cumberland ADD, Purchase ADD, Big Sandy ADD, Green River ADD, and Kentucky River ADD and has distributed to these entities a total of $698,000 since the first pass-through award in FFY 1990.

Since the beginning of the Section 205(j)/604(b) pass-through funding program, several advances have been made toward improving water quality in the Commonwealth. In particular, funding recipients have recognized the importance of providing viable alternatives to existing and proposed package plants and septic systems or, at a minimum, improved operational performance. Accordingly, many of these agencies have worked with local governments to plan and secure financial assistance for regional wastewater projects that can replace or forestall package plants and on-site wastewater systems and provide many Kentuckians with reliable sewage treatment for the first time.

## Impediments to Regionalization

For a variety of reasons, regionalization is not an easy objective to achieve. Even where technical solutions to the inefficient provision of wastewater service exist, other impediments all too often stand in the way of implementing these solutions. Four general categories of impediments in particular hamper many regionalization efforts in the Commonwealth: *cost* (to state, communities, or users); *political boundaries*; *multi-jurisdictional arguments*, and *local opposition/non-consensus*.

If regionalization efforts are to produce significant and lasting water quality improvements, the state and its entities must have expanded authority to compel effective and equitable measures to deal responsibly with wastewater treatment. From experience in Kentucky and in other states, the DOW has developed numerous recommendations for legislative, regulatory, and agency-level measures to address many of the impediments described above. Those recommendations form the basis for the final chapter of this report.

## Recommendations and Conclusions

Based on the DOW's experience in regulating wastewater systems and attempting to implement regionalization, staff have developed several recommendations for legislative, regulatory, and procedural innovations to facilitate regionalization efforts.

### Legislation

Following are summaries of some of the key legislative provisions being evaluated by the DOW, many of which are based on models of successful legislation enacted in other states. Texts of several draft bills are included in appendices to this report.

#### Legislative Item 1: Assurances of Responsibility for Package Plant Operation

Legislation enacted in Nevada addresses the need for the owners of package plants to provide for the long-term operation of their facilities by requiring them to secure the financial involvement of a responsible local government. The owner of the system must furnish the governmental entity with a sufficient and acceptable surety (in the form of a bond, certificate of deposit, etc.) to ensure the continued maintenance and operation of the system. Furthermore, Nevada's legislation also mandates that a non-POTW connect, at the owner's expense, to a POTW as soon as one becomes available.

If implemented in Kentucky, such legislation would forestall many of the problems caused by plant owners who abandon their facilities, go bankrupt, or refuse to relinquish systems that they have allowed to deteriorate into gross noncompliance. The requirement of active local government involvement would

ensure that a stable entity could be made liable for plant operation in the event of the owner's disappearance or noncompliance; unlike an individual or private corporation, a public entity cannot simply disappear or dissolve as a means of evading responsibility. However, since the owner must furnish a form of surety against default, the government would not be left to shoulder the financial burden of the plant alone.

For the complete draft of this bill, please refer to Appendix E.

### Legislative Item 2: Long-Range Plans for Non-POTWs

The DOW has found through experience that, over time, many package plants are burdened beyond their design capabilities because the owners of these systems allow too many connections /add-ons, and they fail to plan for future growth and the consequent increase in demand for wastewater service. Unable to handle the volume of waste received, these plants discharge poorly treated effluent into the receiving waters.

This legislative proposal would require that, before applying to the DOW for a permit to construct or expand a sewage system serving residences and/or other sources of domestic-type sewage, the facility owner must submit a long-range wastewater treatment plan to assure that adequate treatment capability will be provided for the projected service area. The facility owner must also submit a statement from any POTW in the sewage system planning area, describing the long-term plans for providing service to customers in the area, and must put up a performance bond.

For the complete draft of this bill, please refer to Appendix F.

### Legislative Item 3: Wastewater Planning by Local Governments

One of the detrimental effects of the uncontrolled siting of wastewater facilities is a tendency to encourage growth around it. While most citizens would like to see government control urban and suburban sprawl, preserve rural areas, and contain the cost of providing numerous services, unplanned growth typically thwarts these efforts. The proposed legislation would require local and regional governments to plan for water and wastewater service provision and to exercise responsible control over the siting of wastewater facilities.

Specifically, this bill would require every county, in conjunction with cities incorporated within the county or as a region composed of multiple counties, to develop and implement an area-wide wastewater and drinking water management plan. The plan would address the sewage treatment, distribution, and collection and the drinking water treatment and distribution needs of the county over 10- and 20-year projections and develop a responsible, coordinated strategy to meet those needs.

For the complete draft of this bill, please refer to Appendix G.

### Legislative Item 4: Allowing MSDs and Sanitation Districts to Serve Contiguous Counties

Metropolitan sewer districts (MSDs) are limited by KRS Chapter 76 to first- and second-class cities and the counties containing such cities. Although the MSD concept could be used in many jurisdictions in Kentucky, the state's only existing MSD serves Louisville and Jefferson County.

More than 200 package plants now operate in Jefferson County. The MSD has an active program through which it acquires, operates, and ultimately connects them to its comprehensive system. Local opinion is divided over whether the Louisville-Jefferson County MSD should extend its operation beyond

the Jefferson County boundaries to parts of those Jefferson County watersheds extending into contiguous counties. Efforts are currently underway to create an interlocal agreement with Oldham County to serve some of their residents. However, express legislative authority to extend its boundaries outside Jefferson County could greatly simplify the process of providing service in this case. A statutory change in KRS Chapter 76 specifically allowing MSDs to receive wastewater from contiguous counties or from watersheds that extend into contiguous counties would greatly assist the district's efforts toward regionalization.

A bill articulating this legislative proposal has not yet been drafted.

### Legislative Item 5: Elimination of Exemptions for Wastewater Operators at Schools

Under KRS 223.160, operators of wastewater facilities for schools are required to have a limited certificate of competency, rather than the full certification required for operators of other wastewater systems. The limited certification documents the ability of an individual to operate a specific treatment facility, as opposed to any facility of the same size class and treatment method.

The experience of the DOW staff, however, has indicated that treatment facilities for schools are just as complicated as other classifications of wastewater facilities. In order to ensure the reliable and sanitary operation of these systems, they should be managed by a fully certified operator with more training than is required for a limited certificate. For this reason, the DOW recommends that KRS Chapter 224 be amended to delete the exemption for wastewater facility operators at schools.

A bill articulating this legislative proposal has not yet been drafted.

### Legislative Item 6: Assurance of Adequate On-Site Wastewater Treatment

Effective on-site wastewater treatment methods will not be proscribed in the pursuit of regionalization. However, in some parts of Kentucky residents do not use any treatment at all before disposing of their domestic waste. Instead it is "straight-piped" into the nearest stream or ditch. Failing septic systems are another widespread problem in the state (refer to Appendix A).

State and local health and water officials need the authority to ensure that new residences are equipped with adequate on-site wastewater treatment if they are not connected to an off-site treatment plant. This objective could be implemented with a requirement that electrical hook-ups will only be provided to new sites upon certification that the site has adequate wastewater treatment. The requirement would ensure that site owners could not receive a desirable commodity (electricity) until they have taken responsible measures to dispose of their own waste.

Another alternative to ensuring adequate on-site wastewater service is to place the responsibility on the owner or realtor of a dwelling or building lot to certify the existence of a reliable wastewater treatment method to serve the property. This method would be institutionalized in the transaction process with other disclosure requirements that already afford protections to those purchasing real estate.

A bill articulating this legislative proposal has not yet been drafted.

### Legislative Item 7: Allowing Smaller Service Areas for Urban Services Districts

KRS Chapter 108 provides for the creation of urban services districts. However, each district must contain an area of at least ten square miles. This requirement may prevent many localities from

making use of such an organizational option to implement regionalization. This minimum size restriction should be decreased, although not so much that it would thwart the objective of regionalization.

A bill articulating this legislative proposal has not yet been drafted.

## Administrative Regulations

The DOW possesses the legislative authority to control many aspects of wastewater facility construction and operation. However, the agency needs some regulatory clarification of the particular criteria and mechanisms it may use in exercising its authority to implement regionalization. The objective of a regulatory thrust should be to implement requirements that are fair to all parties *and* stringent enough to promote regionalization.

Following are summaries of some of the key regulatory options being evaluated by the DOW:

### Regulatory Item 1: Facilities Construction Regulations

The DOW's Facilities Construction Branch recently drafted revisions to the regulations governing the construction of wastewater facilities in the Commonwealth and has incorporated into them language supportive of wastewater regionalization.

As a condition of new and reissued KPDES permits for package plants in the Commonwealth of Kentucky, the DOW currently stipulates that the facility must connect to a regional system when one becomes available. However, the definition of "available" has not been expressly established, and thus it is vulnerable to legal challenge. The new facilities construction regulations have sought to clarify this term by including distance and cost criteria for determining the "availability" of a regional wastewater facility for connection: the smaller facility must hook on if it is within one mile of the regional facility, *or* if the cost to connect is less than 150 percent of the cost of the smaller treatment facility.

The DOW is currently drafting proposed regulations containing these provisions and is preparing to submit them shortly to the Legislative Research Commission (LRC) to begin the formal amendment process.

### Regulatory Item 2: Additional Requirements for "Bad Actors"

Many package plants in non-compliance can be linked to owners who have already earned a bad performance record with one or more facilities. Some of these "bad actors" evade personal responsibility by creating multiple corporations to serve as the "owners" of these plants for the purposes of acquiring the necessary operational permits.

Stricter regulations should apply to these "bad actors" to compel them to shoulder their responsibilities and provide guarantees against default or gross operational negligence or to authorize DOW to refuse permits to bad actors that can be identified to own all or a specified portion of an existing or proposed wastewater facility. Stringent permit criteria should include the ability to generate sufficient revenues for operation and maintenance and financial reserves for major maintenance activities and facility replacement or connection.

### Regulatory Item 3: Facility Status Report for Permit Renewal Consideration

Under current regulation, the DOW is not authorized to require any information from a permit renewal applicant concerning the current condition of an existing package plant, e.g., the condition of the facility, necessary maintenance/repairs.

For this reason, the DOW recommends a regulatory change to require that a KPDES permit renewal application be accompanied by a current inspection report on plant and equipment condition, the expected remaining life of the facility, and necessary maintenance. The report should be current to within 30 days prior to the application date and should be prepared and sealed by a registered professional engineer. As appropriate, based on the compliance record of the plant, a compliance schedule should be included in the report. DOW should be given the express authority to condition or deny a permit based on the facility report.

A regulation incorporating this recommendation has not been drafted.

## Miscellaneous Recommendations

The following recommendations for other measures to further the wastewater regionalization objective involve neither legislative nor regulatory suggestions at this stage.

### Funding for Small Wastewater Projects

The Purchase Area Development District (PADD) is exploring the idea of establishing a fund for very small wastewater regionalization projects that normally cannot compete for funding from such existing sources as the Kentucky Infrastructure Authority (KIA), the Farmers Home Administration (FmHA) or the Community Development Block Grant (CDBG) program. Although these projects are typically too small to compete for traditional types of funding, they often could provide very cost-effective, straightforward solutions to chronic local problems. A simple sewer line extension, for example, could eliminate one or more package plants or a cluster of failing septic systems at a fairly low cost in some areas of the state. The PADD is looking into ways to create a funding pool solely for such small projects or to make them more competitive for existing funding sources.

The PADD has communicated with the DOW and several other parties to determine the level of support for a new program to meet these needs. PADD officials are also evaluating other existing programs, such as the KIA funds (including the SRF), as possible vehicles for implementing the proposal without establishing a completely new funding program.

### Improved Coordination Between the DOW and the Public Service Commission (PSC)

While the DOW regulates all wastewater facilities that discharge from a point source into the waters of the Commonwealth, the PSC is also authorized under 807 KAR 5:071 to regulate the financial aspect of privately owned sewer utility systems, which include many package plants.

For wastewater utilities over which both the PSC and DOW have jurisdiction, the agencies have developed an understanding to minimize duplication of effort and to allocate regulatory responsibilities (refer to Chapter 4). This cooperation was extended in 1991, when staff from the PSC and the DOW

successfully combined their authorities in taking joint legal action against one of Kentucky's worst package plant operators. Following this achievement, the DOW proposed the development of a permanent working relationship between the DOW and PSC to focus on wastewater operators who violate the Commonwealth's water treatment and water pollution laws and provide rate payers low or no service for their water-related utility fees.

Little formal action has been taken on this proposal to date. However, such coordination between these two agencies would provide an effective tool in the effort to achieve better package plant performance and to promote regionalization in cases where it proves feasible.

## Alternatives to Regionalization

Ultimately, the goal of regionalization is not merely a reduction in the number of wastewater facilities but an improvement in water quality. In some cases, operator training may provide the most feasible way to improve performance and achieve compliance. Under other geographic and demographic conditions, the answer may lie in alternative small-scale wastewater systems.

### DOW-Sponsored Training and Technical Assistance for Operators

According to state regulation, package plants treating up to 50,000 gallons per day (gpd) must be operated by individuals with Class I licenses. To earn a Class I certification, operators must have a high school diploma or GED and one year of operational experience. They must pass a certification examination with a score of 70 percent or higher. Certified Class I operators must earn 12 hours of continuing education credits to renew their license by June 30 of odd-numbered years.

The DOW's Operator Certification Section is responsible for training and certifying all wastewater system operators in the Commonwealth. Training is conducted by four staff members and is accomplished through classroom instruction and the COMPTrain program (for more information on the latter program, refer to Chapter 4 of this report). In 1993, approximately 1,470 wastewater operators, or roughly half of the active operator community, attended operator training sessions. This program reaches a significant portion of the operator community with low-cost, quality instruction.

Currently, however, a lack of administrative staff will hamper the Operator Certification Section's ability to offer a comparable level of operator training in 1994. Without adequate financial support, this training service will cease to exist and a large part of the operator community will go unserved. A lack of access to organized, affordable training may prevent some certified operators from renewing their licenses.

The training functions of the Operator Certification Section should be supported and used to the fullest extent possible in the effort to improve wastewater facility performance by training the operators who run the facilities.

### Training and Technical Assistance for Operators: The Circuit Rider Concept

In light of the constraints imposed on the training and assistance activities of the DOW's Operator Certification Section (see above recommendation) and recognizing that the DOW's enforcement role can sometimes hinder the development of rapport between the regulator and the regulated, the DOW used a portion of its Section 205(j)/604(b) monies (refer to Chapter 6 for information on this program) to fund a

U.S. Army Corps of Engineers feasibility study of the possible employment of a "circuit rider" to assist package plant operators.

A circuit rider would be a certified wastewater treatment plant operator/consultant who would provide individualized on-site training and assistance to package plant operators. The resulting improvements in operation and maintenance would raise the quality of the plant's effluent and reduce unnecessary operation and maintenance costs in many cases. A circuit rider already provides wastewater service in the Western Kentucky area through the Kentucky Rural Water Association (KRWA), but funding has not been available to extend this service to other areas of the state.

The DOW recommends that funding be dedicated to support the development of a circuit rider program for package plants in Eastern Kentucky.

### Alternative Small-Scale Wastewater Technologies

In previous decades, government wastewater policies and funding programs endorsed technology-intensive, large-scale wastewater systems as the only acceptable off-site treatment method. Although these "conventional" wastewater systems produce economies of scale with larger customer bases such as municipalities, research has advanced several alternative collection and treatment systems, including constructed wetlands, small-diameter pressure sewers, "cluster" systems, and composting and incinerating toilets.

**Constructed wetlands** are human-engineered wetlands created to harness the natural ability of these ecosystems to break down the pollutants found in domestic sewage. These systems may prove a viable wastewater treatment alternative where soils are rocky and the water table is shallow, or where space for an on-site system is limited. **Cluster systems** can achieve regionalization on a small scale to eliminate the need for individual on-site septic tanks and drainfields (for information on septic systems, refer to Appendix A). The actual treatment technology used may be a variant of an on-site system, such as a soil absorption system, constructed wetland, or intermittent sand filter. A cluster system typically uses **small-diameter pressure sewers** to collect and transport wastewater from several homes. These sewers, made of sturdy plastic, are smaller in size and less costly to install and maintain than conventional sewers. Cluster systems generally can serve two or more homes, but less than an entire community. **Composting and incinerating toilets** can be used to deal with the human waste component of domestic sewage. Composting toilets contain the waste instead of discharging it to an external collection or treatment system and turn it into compost. Incinerating toilets reduce the toilet waste stream to ash for subsequent disposal.

The above technologies, singly or in various combinations, may be able to solve some of the wastewater problems currently addressed with package plants or even straight pipes. Other treatment technologies or variants of existing options may also be needed for application in some of the most demanding settings, particularly in Eastern Kentucky's mountainous, rolling terrain and the fragile karst areas throughout the Commonwealth. A variety of resources on alternative wastewater treatment methods is available from the Small Flows Clearinghouse at West Virginia University.

## Conclusion

With the implementation of the legislation, regulations, and other innovations proposed in this chapter, the DOW seeks to bring Kentucky's wastewater policy more closely in line with that of the federal

government and to resolve some of the difficulties currently standing in the way of effectively implementing the regionalization policy.

Regionalization will not happen everywhere immediately, even with the help of the measures recommended in this document. In some areas, it may not offer a feasible solution to wastewater problems due to geographic and/or cost constraints. In other areas, regionalization may not prove necessary in the immediate future if package plant performance can be improved by more effective operator training and technical assistance or if failing on-site systems can be replaced by more reliable systems.

However, in many cases, regionalization presents the most logical and responsible answer to an area's wastewater treatment problems, but organizational problems, cost, or local politics stand in the way of implementing a solution that would benefit local residents and other taxpayers in the Commonwealth. Often the solution demanded by regionalization will prove unpopular to the locally affected parties. Ultimately, the Commonwealth of Kentucky must exercise its broader authority in these situations to compel regionalization in an equitable fashion if it is to protect citizens from the degraded water quality and health risks associated with poor sewage treatment. It is these difficult situations that the regionalization recommendations in this report are intended to address.